10. Martyn

Program Name: Martyn.java **Input File: martyn.dat**

Martyn's two favorite things that he learned in his Computer Science class are Palindromes and Numeric Bases… why not combine the two? Martyn is interested in knowing, among a list of bases, which bases, if any, a given unsigned integer is palindromic in. Help Martyn in writing a program to list out those such bases.

Input: The first line of input will consist of a single integer n ($1 \leq n \leq 2.5 \cdot 10^5$) denoting the number of test cases. The next n test cases will consist of a single unsigned integer m_i (for all i, $1 \leq i \leq n$: $0 \leq m_i \leq 2^{31} - 1$), denoting the i^{th} number that Martyn is interested in checking.

Output: For each of Martyn's n requests, print out a comma-and-space-separated list of the bases which a given request m_i is palindromic in, or the string "`None.`" if there are none. Note that a valid solution should consider all integer bases starting from base 2 and up until base 64. For the sake of simplicity (traditionally, bases after 36 break this rule), you may assume that a given base *b* uses the first *b* symbols from the following alphabet:

```
0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz+/
```

When converting to a given base *b*, you should express the number to its minimal width. That is, if a number m_i can be represented with a minimum of k characters, then disregard whether the number may be palindromic for any equivalent padded version of that string with more than k characters. Moreover, for bases like base 64 which traditionally prepend '='s to pad a number out to a certain width, disregard the need for such padding.

Sample input:

```
5
33
180149434
31
187544
0
```

Sample output: (*indented lines are continuation of previous line*)

```
2, 10, 32, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49,
      50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64
16
2, 5, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48,
      49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64
33
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22,
      23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40,
      41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58,
      59, 60, 61, 62, 63, 64
```